

**WHAT IS CLAIMED IS:**

1. A method for enhancing acoustic signal buried in noise within a digitized acoustic input signal, including:

- sub C1
- (a) transforming the digitized acoustic input signal to a time-frequency representation;
  - (b) estimating a background noise level in the time-frequency representation;
  - (c) for each interval of the time-frequency representation containing significant signal levels, comparing the time-frequency representation of such interval with a signal model and determining a template in the signal model that best matches the time-frequency representation of such interval, based in part on signal to noise ratio; and
  - (d) replacing the digitized acoustic input signal with a low-noise output signal comprising a mix of the digitized acoustic input signal and the best matching template.

2. A method for enhancing acoustic signal buried in noise within a digitized acoustic input signal, including:

- sub C1
- (a) transforming the digitized acoustic input signal to a time-frequency representation;
  - (b) isolating transient sounds within the time-frequency representation;
  - (c) estimating background noise and including long transients without signal content and background noise between transients in such estimating;
  - (d) rescaling the time-frequency representation of the estimated background noise;
  - (e) comparing the rescaled time-frequency representation of each transient containing any signal of interest with a signal model and determining a template in the signal model that best matches such representation; and
  - (f) resynthesizing a low-noise output signal using the best matching template.

1 3. A system for enhancing acoustic signal buried in noise within a digitized acoustic input  
2 signal, including:

- 3 (a) means for transforming the digitized acoustic input signal to a time-frequency  
4 representation;  
5 (b) means for estimating a background noise level in the time-frequency representation;  
6 (c) for each interval of the time-frequency representation containing significant signal  
7 levels, means for comparing the time-frequency representation of such interval with  
8 a signal model and determining a template in the signal model that best matches the  
9 time-frequency representation of such interval, based in part on signal to noise ratio;  
10 and  
11 (d) means for replacing the digitized acoustic input signal with a low-noise output  
12 signal comprising a mix of the digitized acoustic input signal and the best matching  
13 template.

14 4. A method for enhancing acoustic signal buried in noise within a digitized acoustic input  
15 signal, including:

- 16 (a) means for transforming the digitized acoustic input signal to a time-frequency  
17 representation;  
18 (b) means for isolating transient sounds within the time-frequency representation;  
19 (c) means for estimating background noise and including long transients without signal  
20 content and background noise between transients in such estimating;  
21 (d) means for rescaling the time-frequency representation of the estimated background  
22 noise;  
23 (e) means for comparing the rescaled time-frequency representation of each transient  
24 containing any signal of interest with a signal model and determining a template in  
25 the signal model that best matches such representation; and  
26 (f) means for resynthesizing a low-noise output signal using the best matching  
27 template.

5. A computer program, stored on a computer-readable medium, for enhancing acoustic signal buried in noise within a digitized acoustic input signal, the computer program comprising instructions for causing a computer to:

- (a) transform the digitized acoustic input signal to a time-frequency representation;
- (b) estimate a background noise level in the time-frequency representation;
- (c) for each interval of the time-frequency representation containing significant signal levels, compare the time-frequency representation of such interval with a signal model and determine a template in the signal model that best matches the time-frequency representation of such interval, based in part on signal to noise ratio; and
- (d) replace the digitized acoustic input signal with a low-noise output signal comprising a mix of the digitized acoustic input signal and the best matching template.

6. A computer program, stored on a computer-readable medium, for enhancing acoustic signal buried in noise within a digitized acoustic input signal, the computer program comprising instructions for causing a computer to:

- (a) transform the digitized acoustic input signal to a time-frequency representation;
- (b) isolate transient sounds within the time-frequency representation;
- (c) estimate background noise and include long transients without signal content and background noise between transients in such estimate;
- (d) rescale the time-frequency representation of the estimated background noise;
- (e) compare the rescaled time-frequency representation of each transient containing any signal of interest with a signal model and determine a template in the signal model that best matches such representation; and
- (f) resynthesize a low-noise output signal using the best matching template.